

Studley (6)

NOTES

UPON

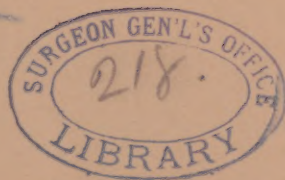
HUMAN REMAINS

FROM THE

CAVES OF COAHUILA, MEXICO.

BY

CORDELIA A. STUDLEY.



[From the XVI REPORT OF THE PEARBODY MUSEUM OF AMERICAN ARCHEOLOGY
AND ETHNOLOGY; Cambridge, Mass., 1883.]

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NOTES UPON HUMAN REMAINS FROM CAVES IN COAHUILA.

BY CORDELIA A. STUDLEY, ASSISTANT IN THE MUSEUM.

IN 1880 Dr. Edward Palmer procured for the Museum an osteological collection of considerable interest from four caves in the limestone formation in the state of Coahuila, Mexico.¹

The first cave examined is in the western part of the state near San Antonio del Coyote, to whose inhabitants it is known as Coyote Cave. Its length originally was 150 feet, width 20 feet, and height 12 feet. This cave was discovered about 1865, by an Indian who told Dr. Palmer that when he led the first party into it many mummies were to be seen there carefully disposed, side by side, children between the grown people, each wrapped in its blankets and bound about with bands of netting. The treasure-hunters whom he conducted into the cave, brought out and broke up the bundles in search of gold, but finding none, they burned the human skeletons and interesting objects found with them. A small collection, it is said, was saved and sent to Spain. Since then the roof of the cave has fallen in, closing up the original entrance and filling up most of the chamber. Now, it can be entered only through a hole in the roof, by means of a rope. At the bottom of the shaft, Dr. Palmer found six bundles or "mummies" and a few scattered bones and fragments. Four of the bundles contained each a perfect cranium and nearly entire skeleton. Of the other two bundles, one contained a calvarium in pieces and a left humerus; the other, a femur, and the leg bones of several individuals, with a small enclosed bundle of bones, not yet opened. The outer wrappings of some of the bundles were encrusted with breccia to the thickness of an inch in some places.

Twenty-seven leagues southwest of Parras, near San Lorenzo de la Laguna, is the second cave Dr. Palmer explored. It is between 50 and 100 feet square. The floor inclines 55°, and the

¹ This collection is mentioned in the Fourteenth Report of the Museum, but the many interesting objects found in the bundles or loose in the caves have not yet been described. They are, however, on exhibition in two cases on the Mexican gallery of the Museum.—F. W. P.

height, which at the entrance is 15 feet, rapidly diminishes going inwards.

This may be the cave to which Dr. Wislizenus made allusion in 1847 as follows: "On the right hand or south of us,² a chain of limestone mountains was running parallel with the road. At the foot of a hill belonging to that chain, Señor de Gaba pointed out a place to me where some years ago a remarkable discovery had been made. In the year 1838 a Mexican, Don Juan Flores, perceived there the hidden entrance to a cave. He entered, but seeing inside a council of Indian warriors sitting together in the deepest silence, he retreated and told it to his companions, who, well prepared, entered the cave together, and discovered about 1000 (?) well-preserved Indian corpses, squatted together on the ground with their hands folded below the knees. * * * This is the very insufficient account of the mysterious burying-place. The Mexicans suppose that it belonged to the Lipans, an old Indian tribe, which from time immemorial has roved and is roving over the Bolson de Mapini."

About twenty years ago, many caves in this region were worked for salt-petre and at that time many bundles with their contents were used for fuel by the miners. From this cause Dr. Palmer did not find in the cave near San Lorenzo a single bundle undisturbed, but only bits of wrappings, sandals and a few other objects, in addition to some of the scattered human bones. Fifteen skulls, several fragments of skulls, a number of odd limb bones, with a few pieces of pelves and scapulæ were secured. Some of these bones were blackened and charred in spots, and evidently had been thrown aside by the salt-petre miners.

The third cave, twenty-six leagues east of Parras, near Acateta, is 93 ft. long, 5 to 8½ ft. wide, and but 4 ft. high in the highest part. The floor was covered with a layer of the excrement of rodents several inches deep, from beneath which six crania, a sacrum and several vertebræ were removed.

The fourth and last cave explored is situated fourteen leagues northeast of Monclova. Its length is 150 ft., width 15 to 20 ft., and height 12 to 20 ft. It was visited first in search of hidden Spanish treasure, afterwards by collectors of Indian trinkets, and still later its bundles served to feed the fires of the salt-petre workers. At the time of Dr. Palmer's visit, there remained only

² Dr. Wislizenus was marching from San Sebastian to San Lorenzo.

traces of the bundles, in bits of cloth, matting, etc., with one cranium and some fragments of crania. The left half of the skull is charred probably by the fires of the salt-petre miners.

SKELETONS.

The bones from the various caves are well preserved. They indicate a muscular and strongly built people. None of the bones of the skeleton show marks of disease or injury, except the lower third of a right fibula from a bundle in Coyote Cave. This fragment is much thickened by some inflammatory process.

Four atlases only were found, belonging to the four skeletons from Coyote Cave. Each has a foramen for the vertebral artery, formed by a spiculum of bone carried over the usual groove to the posterior border of the arch. Upon two of the vertebræ this bony bridge is very broad, is perforated near its origin, and sends off a stay to the transverse process.

Forty-six per cent, or six, of the thirteen humeri are perforated through the olecranon fossa. The perforations vary in shape and size with the different skeletons and with the two sides of the same skeleton. In one instance the bone of one side is perforated, and that of the opposite side is entire.

The linea aspera of the femur is carinated.

The sixteen tibiæ are all more or less flattened as compared with the tibiæ of Europeans. The antero-posterior and breadth diameters of the bone being taken at the level of the nutrient foramen, according to Wyman's method, the breadth *index* averages for the sixteen tibiæ 626; the maximum being 697, that of both tibiæ of skeleton No. 22846, and the minimum 513, that of a left tibia No. 22665. Beside the skeleton No. 22846, there are two others having both tibiæ, and in each instance the flatter tibia is upon the left side.

Stature. — Following the usual method of estimating the height from the skeleton by reckoning the length of the femur as .275 of the height; the femora of thirteen skeletons give an average stature of 1662 mm. or 5 ft. 5.3 in. The maximum is 1680 mm. or 5 ft. 6.1 in., calculated on a femur from San Lorenzo Cave. The least stature is 1502 mm. or 4 ft. 9 in., but this may be that of a woman as the femur on which its estimation is based is the most slender of the thirteen. The average is 12 mm. or about $\frac{1}{2}$ in. above Topinard's mean for all races; but eight of the thirteen are below this average.

Lengths and Proportions of the Long Bones.—There are four paired humeri, two odd humeri, a right and a left, and the lower half of a left humerus, from Coyote Cave. From San Lorenzo Cave, there are two humeri, belonging to the left side. The five right humeri average 314 mm. in length, and the seven left humeri have an average length of 316 mm. When the left humerus varies at all in length from the right humerus of the same skeleton it is found to be shorter.

Corresponding to the four paired humeri from Coyote Cave, there are three paired radii and one left radius, and, from the same cave, two odd right radii. From San Lorenzo Cave, there is a left radius. The average length of the five right radii is 250 mm. and of the five left radii 252 mm. As in the humeri, when any variation occurs in the length of paired bones that of the left side is the shorter.

The ratio expressing the relative lengths of radius and humerus has been found to establish a broad distinction between races. Broca found this ratio in negroes to be 794 and in Europeans 739. The four skeletons from Coyote Cave give a humero-radial index of 796, by which they are widely separated from the European and more nearly resemble the negro-type.

Three skeletons from Coyote Cave are represented by their femora, two by pairs and one by that of the right side only. From the same cave there are also three single right femora and an odd left one. From the cave near San Lorenzo we have an odd right femur and five left femora. The average length of the bone of the right side is 447 mm.; of that of the left side 445 mm. Upon one skeleton, the femora of opposite sides of the body are of the same length, upon the other skeleton, the left femur is the shorter.

Corresponding to the femora from Coyote Cave, there are a right tibia and two paired tibiae, and in addition an odd right and three odd left tibiae. There are from the cave near San Lorenzo five odd tibiae, four belonging to the right and one to the left side. The length of the nine right tibiae averages 381 mm. and of the seven left tibiae 382 mm. The left tibia is longer than the right by 1 mm. upon one skeleton, but is shorter than the right tibia upon the other two skeletons.

The femoro-tibial index averages 867 upon three skeletons, furnished with both bones for comparison.

The intermembral index, or the expression of the proportion existing between the superior and inferior extremities, which is found by comparing the added lengths of the humerus and radius with those of the femur and tibia, is 678 in the three skeletons from Coyote Cave. Broca states this to be 683 in the negro and 697 in the European.

Unfortunately, the results of observations on the bones from these caves do not carry as much weight as if they were based upon a larger number of skeletons. So far as they go, they serve to establish the following facts. First, when any variation is seen in the length of corresponding bones from the same skeleton, it is the bone of the right side of the body which is the longer. Second, the clavicle in relation to the humerus is longer than among Europeans. Third, the superior extremity relatively to the inferior is shorter than among Europeans. Fourth, this shortness of the superior extremity depends upon the shortness of the humerus, as the forearm as compared to the arm is longer than among Europeans. Fifth, the tibia is relatively to the femur longer than among Europeans, which must be taken into consideration as influencing the relative length of the two extremities. By all these characters the skeletons from Coahuila are nearer to the negro than to the European type.

CRANIA.

Twenty-five crania, most of them perfect, including three of children, were found suitable for measurement. Of these, fourteen, one that of a child, were collected in the cave near San Lorenzo; six, two belonging to children, came from the cave near Acateta; four, each with its accompanying skeleton, were found in bundles in Coyote Cave; and a single cranium was picked up in the cave near Monclova.

In the determination of sex and age, the methods of Broca and Topinard have been followed. The crania of adult individuals are thus classed as fifteen male and seven female. The men were from twenty to seventy years, the women from twenty-two to forty-five years. The average age of the men was forty-five, of the women thirty-six. The three children were respectively, ten, eleven, and thirteen years.

Dolichocephali.—Fifty-six per cent, or fourteen skulls, are long. Of these, three of men and two of women are from the San

Lorenzo Cave, four of men and two of children are from the Acateta Cave, two of men are from the Coyote Cave and one woman's cranium is from the Monclova Cave. That each of these disassociated caves contributes a large per cent of the crania found in it to the dolichocephalic class authorizes the inference that a long-skulled people were formerly widely distributed over Coahuila.

The skulls are small; the men's having an average capacity of 1361 cc. and the women's 1100 cc. Four of the nine men's and all the women's and children's crania are microcephalic.

None are flattened posteriorly or otherwise deformed so as to depreciate the value of measurements taken upon them.

In profile, the long skull presents to view an oval, with the larger end behind. Commonly, it rests in ordinary equilibrium, but two rest in posterior condyloid, and one in posterior mastoid equilibrium. From the ophryon over the vertex to a point just above the obelion, the outline is defined by the carinated ridge. At the ophryon, this ridge is narrow, but gradually widens as it approaches the bregma. Here, again, it is narrow, but increases in width until, just above the obelion, it bifurcates, and either encloses a small slightly flattened area, the region of the obelion, or runs down divergingly to the lambdoid suture, or disappears upon the parietal bone. Over the frontal bone the outline is retreating, and for two-fifths of the sagittal length it extends horizontally or rises a little on skulls with a prominent carinated ridge. Just before its bifurcation, the ridge diminishes in strength, and this with the slight flattening over the obelion gives a sloping outline to the posterior two-fifths of the parietals. Below the lambda is seen the gently swelling occipital scale. Posteriorly, the diameter of maximum length ends midway between the lambda and inion on two, a little below midway in most, and over the inion in two, crania. The vertical plane of the inion is but little posterior to that of the lambda; its horizontal plane but slightly raised above the alveolar plane.

The mastoid process is noticeably full and broad. Its long, rough posterior border is directed obliquely downwards and forwards. A line continuing this border upwards and backwards would pass along the line of the posterior portion of the temporal ridge.

The temporal ridge embraces in its sweep the greater part of the side of the head. Passing close in front of the asterion and along the lambdoid suture from one-third to half-way to the lambda, it

then curves forwards over or above the parietal eminences, reaching its highest point about 2 cm. back of the coronal suture, where it is separated from the ridge of the opposite side but 88 mm. in the male and 80 mm. in the female skulls.

Viewing the skulls from either behind or in front, one is struck with their pentagonal form. The longest side of the pentagon is the base of the skull, and next in length are the nearly flat sides of the head, which turn at the parietal eminences to form the slanting roof. The sharpness of the superior angle depends on the strength of the carinated ridge. Although in three skulls the diameter of maximum breadth ends at the centre of the parietal eminences, and in two over the squamous suture, yet in the majority it ends at a point a little below midway between the centre of the eminences and the squamous suture. It falls uniformly back of the auriculo-bregmatic line, a distance averaging 23 mm. on the male, 17 mm. on the female, and 25 mm. on the children's crania.

Both vertex and base are oval. The narrower end is anterior, except in Nos. 22648 and 22693. These two are noticeable from other characters than their narrow bulging occiput. They are microcephali: long, low and very narrow, with the same breadth index of 674. Their diameter of maximum breadth ends at the squamous suture. Their exaggerated length is not due to synostosis; for, except the basilar, the sutures are all open, internally as well as externally. The lambdoid suture of 22648 is just beginning to close on the left side near the lambda. No. 22693 is from the cave near Monclova, and from the same cave there are two calvaria, wanting the frontal bone with open sutures which are of the same long and narrow form with a full occiput. No. 22648 if viewed by itself might be considered abnormal, but No. 22693 and its associated calvaria from another cave present the same shape so slightly modified as to link it with the rest of the group, making it evident that both skulls must be taken as only individual variations of the long type.

The various surfaces, spines and processes for muscular attachment upon the base of the skull are well developed. The pneumatic spine of Hyrtl is seen upon two.

The position of the foramen magnum was reached by means of projection measurements on the mature skulls. Two of the skulls of women, unfortunately, are unfitted for this measurement

by the broken condition of the alveolar process. The average centre of the base of the skulls of men is 3 mm. in front of the basion, back of which the foramen magnum stretches for 35 mm., bringing its centre 20 mm. back of the centre of the base of the skull. In one woman's skull, it is 16 mm. back of the centre of the base. There is no constant relation between the capacity of the skull and the size of the foramen magnum, although the largest skull has the largest, and the smallest skull the smallest foramen magnum.

The three most extensive sutures, the coronal, sagittal and lambdoid, increase in complexity going backwards, the coronal corresponding to 2 and 3, the sagittal to 3 and 4 and the lambdoid to 3, 4 and 5 of Broca's scale. These sutures are open in five male and three female skulls. The metopic suture is closed, yet in all but one male skull, there is seen over the glabella a criss-crossing of bony ridges, the serrations of the closed and partially obliterated suture. The frontal, in no instance, articulates with the temporal. The shortest spheno-parietal suture measures but 7 mm. It is on the right side of No. 22646. The internasal suture is closed in No. 22644, and has begun to close in the crania of two adults and a child, all three from Acateta Cave. The intermaxillary suture is seen only on the palatine surfaces of No. 22823 and of the children's skulls.

Eight of the fourteen have no Wormian bones. Six, four of men, one woman's and a child's, have Wormian bones, all of the size numbered 3 in Broca's scale. The woman's skull, No. 22693, has a long bone crossing the right half of the lambdoid suture. The child's skull, No. 22699, has a similarly shaped bone in the same place. No. 22698 has a square bone in the right masto-occipital suture, No. 22701 a long bone, crossing the left masto-parietal, No. 22846 has a long bone crossing each masto-occipital, and No. 22823, three long ones crossing the lambdoid suture, and a triquetral over the lambda. Occasionally very minute supernumerary bones are seen in the coronal suture near the stephanion or in the more intricate of the lambdoid sutures.

The face is long; the diameter of length for the nine male skulls averages 98 mm. This gives, notwithstanding the considerable breadth of the face, the large facial index of 731. The only female skull that could be measured has a facial length of 91 mm. and a facial index of 728. By average length of face and facial index, they resemble the thirteen Greenland Esquimaux skulls, whose

mean measurements are given in the *Crania Ethnica*. The bizygomatic diameter, which gives the maximum breadth of the face, was taken upon seven male and two female skulls. In four of the nine it exceeds the maximum breadth of the head, and in the remaining five the excess in favor of maximum breadth of the head is very slight. A breadth of face exceeding the breadth of the head is characteristic of most skulls of Greenland Esquimaux, according to the measurements recorded by several authorities.

The forehead is remarkably narrow. The glabella commonly projects beyond the ophryon, yet it is not usually prominent. When the superciliary ridges are heavy, the glabella is no more prominent than they, and may be sunk between them. The apparent prominence of the glabella is liable to be exaggerated by a supranasal depression. Such a depression appears upon two skulls, but the others have the root of the nose either on the vertical plane of the glabella or anterior to it.

The interorbital space is narrow and the naso-frontal suture extends higher upon it than the maxillo-frontal, so that these two sutures do not make an even curve or straight line across the space.

The nasal bones are long and of medium width. They are set together at an angle, varying in openness, from a nearly right angle in No. 22846 to a most obtuse in No. 22648. The breadth of the nasal aperture shows considerable individual variation. Five male skulls are leptorhine, three skulls, two male and one female, are mesorhine, and three, two male and one female, are platyrhine. The form of the aperture varies between oval and heart-shaped. One skull has a sharp single lower border to the nasal aperture. Four have this lower border blunt. In six the lines from spine and side are not continuous. In three of these six they are separated by a distinct pit. The nasal spine is short and usually blunt.

Most have straight brows and square orbits. None are microseme. Ten are megaseme and four are mesoseme.

The palate is either hypsiloid or slightly elliptical in form. None are prognathic. Five males and the two children are orthognathic, four males and one female are mesognathic. Unfortunately, two female skulls have broken alveoli and cannot be measured for gnathism. There is no dental prognathism, for the

incisors in those jaws in which they remain are set vertically in the sockets.

Exostoses are rare. Three male skulls have each a thin, slender oval tumor on the middle of the posterior wall of each meatus, the long diameter extending into the opening. One has, in addition, a small oval exostosis on the lower margin of the nasal aperture of the right side. A female skull from the San Lorenzo Cave has a small conical hyperostosis on the superior maxillary midway between the lower margin of the orbit and the first molar.

Two skulls bear marks of superficial wounds; No. 22656 in a small pit in the frontal bone probably at the base of some scalp wound, and No. 22645 in a small flattened spot with three slight cuts above it on the right parietal near the centre of the bone.

Mesaticephali.—Nine crania belong to this class. Seven, six of adults and one of a child, are from the San Lorenzo Cave. Two adult crania are from the Coyote Cave. But it will be remembered that eleven long skulls were got in the San Lorenzo Cave, and two long skulls in Coyote Cave, so that wherever mesaticephali are found dolichocephali are also found in as great or greater number, while one cave, that near Acateta, is represented only by six dolichocephali. As, therefore, the long skull seems to be the prevalent cave type, only variations from it in the other classes are given. The mesaticephali are of greater capacity: four males are megacephalic, two female skulls are mesocephalic, and one male and one child's are microcephalic.

No. 22658 is slightly flattened posteriorly on the right side, so as to push forward a little the parietal eminence of that side. The measurements of the skull are not affected by this inconsiderable distortion. The other mesaticephali are of normal shape. There is less slope to the posterior portion of the parietals than in the long skulls, the outline being more rounded in that region. The long diameter falls upon or above the middle of the occipital scale in six of the nine and in none falls so low as the inion. This is higher than in the long skulls. The inion is also raised higher above the alveolar plane than in the long skulls, and the whole occiput is higher.

The temporal ridge passes above the parietal eminences, although it does not, particularly in the female skulls, enclose so

much of the side of the head as in the long skulls. The mastoid processes are a little shorter, narrower and less full than in the long skulls.

The maximum breadth diameter falls farther back and higher than in the long skulls, but not so high or far back as the parietal eminences.

Like the long skulls, both vertex and base are oval, narrower anteriorly. The lines, spines and processes for muscular attachment, though well developed are not so strong, as a rule, as in the long skulls. No. 22827 has the pneumatic spine of Hyrtl.

The centre of the foramen magnum is 17 mm. back of the centre in the men's skulls. This is 3 mm. anterior to the same point in the male long skulls. The size of the foramen magnum does not bear a constant relation to the size of the skull.

The sutures are of the same general character as in the dolichocephali. The shortest spheno-parietal suture is that of No. 22651, which measures 7 mm. The internasal is open in all. Traces of the intermaxillary appear on the palatine surface of three, one, a child's, No. 22654, the other two, those of young adult females from San Lorenzo Cave.

None have Wormian bones of more than medium size. No. 22649 has a square Wormian in the left masto-occipital; No. 22827 has a long bone in the left masto-parietal and an epipteric on the right side. No. 22651 has a long bone lying across the left half of the lambdoid suture near the lambda. Several have minute Wormian bones in the more intricate parts of the long sutures.

The face is a little shorter and the facial index less than that of the dolichocephali. All have the bizygomatic less than the maximum breadth diameter, differing in this respect from some of the long skulls. The forehead is narrow, low and retreating. Only two have heavy superciliary ridges. None have a supra-nasal depression, or a prominent glabella. The nasal bones are as long and broader, and do not form an angle by their junction as in four of the long skulls.

Four are leptorhine, two platyrrhine. The nasal aperture is oval or heart-shaped. The lower border is formed by a single sharp line. On No. 22827 the lines from the side and spine are not blended, but separated by a deep pit. The nasal bones of No. 22658 appear to have suffered an arrest of development.

The dwarfed bones are united into a bit of bone longest in the median line, where it measures 10 mm., while the length on the side is but 7 mm. Where it joins the frontal, its width is 4 mm., at its point of greatest width it measures 5 mm. The tip is only 3 mm. wide and is curved up like a hook.³ The lower border of the nasal aperture is sloping. This skull is prognathic. The rest of the adult skulls are divided equally between orthognathic and mesognathic. The child's skull is orthognathic. The palate is elliptical or hyperbolic. All are megaseme but one, and have straight brows and square orbits. One is mesoseme.

Three male skulls have one or more exostoses in each meatus. No. 22827 has long flattened tumors passing into each meatus on the anterior inferior and posterior inferior walls, the larger tumor being on the posterior inferior wall. No. 22791 has a long crest-like tumor with its long diameter passing into the opening situated on the posterior inferior wall of each meatus, and a thickening of the anterior walls. No. 22649 has a rounded oval tumor on the middle of the posterior wall, and a thickening of the anterior wall of the right meatus. The left meatus has upon the middle of the posterior wall a large globular tumor, which sends a slender offshoot into the canal.

Two of the male skulls bear traces of wounds. Upon the middle of the right parietal above the eminence of No. 22657 is seen a pit about a centimetre in depth. At this point the endocranium is smooth and uninjured, saved probably by the unusual thickness of the bone. Although a small skull and deprived of most of its face, yet so thick are its walls its weight is 30½ oz. The next heaviest skull is No. 22646, which has a perfect face and yet weighs but 27 oz.

No. 22791 has sustained a remarkable injury, inflicted by a stone arrowpoint which is retained in the superior meatus of the nose. This was discovered by Dr. W. F. Whitney and described by him before the Boston Society of Natural History. The following report of his remarks is taken from the Proceedings of the Society for 1881. "An arrow had entered through the inner side of the left orbit close to the lachrymal duct, pierced the septum, and merely broken through into the right orbit by a small

³ A similar arrest of development of the nasal bones is seen in No. 18599, from a Stone Grave of the Cumberland Valley, Tennessee.

portion of its edge. It was thus lodged close beneath the ethmoid bone and imprisoned there by the partial closure of the entrance through a formation of new bone, which showed also that the man had been shot weeks or even months before his death." Besides this interesting lesion, a blow upon the forehead just above the left brow dented the outer and fractured the inner table. This fracture was perfectly repaired and over the seat of it is a deposit of new bone in the shape of a flat button, measuring a centimetre across.

Brachycephali.—Two broad skulls, a male and a female, were found in San Lorenzo Cave. As this cave has long been open and all the crania from it were found disturbed, these two brachycephali may have been later burials. Apparently, brachycephali were exceptional among the people burying in these caves.

Both are natural shapes. They are microcephalic. The female rests in normal, the male in posterior condyloid equilibrium. The long diameter strikes higher, midway between the lambda and inion in the male and above midway in the female, and the vertical projection of the inion also is greater than in the dolichocephali and mesaticephali. The maximum breadth diameter falls more than a centimetre back of the auriculo-bregmatic line, below the centre of the parietal eminences in both, upon the squamous suture in the male and 20 mm. above it in the female skull. The temporal line curves over the parietal eminences. The mastoid processes are shorter and narrower. A rough line crossing the mastoid process above continues the superior occipital line. The centre of the foramen magnum is back of the cranium 19 mm. in the male, and 23 mm. in the female skull.

The sutures are open; the sagittal, coronal and lambdoid of No. 22647 are beginning to close. Their general character is the same as in the dolichocephali and mesaticephali; but in contrast with these, both have large Wormian bones in the lambdoid suture. No. 22653 has two No. 4 of Broca's scale, a little to the right of the lambda. This skull has besides minute bones in the coronal over the stephanion. No. 22647 has in the left half of the lambdoid suture two No. 3 Wormian bones, and two No. 4, and in the right half two No. 3, and one of unusual size, whose long diameter, lying along the suture, measures 54 mm., and its vertical diameter at the widest part measures 36 mm.

The face is a little shorter than the average of the dolicho-

cephali and of the mesaticephali. The male has a facial index of 664, and the female of 719. The bizygomatic is less than the maximum breadth of the head. There is no supranasal depression.

The internasal suture of 22647 is nearly obliterated. Its nasal bones by their junction form an obtuse angle, nearly right. The lower border of its nasal aperture is sharp, with a well-developed nasal spine. No. 22653 has a long, interorbital process with nearly horizontal suture below it. Its nasal bones are set together so as to form a more open angle. The nasal spine is short and blunt, and the lower border of the aperture, sloping.

The brows are nearly straight, and the orbits open and square. The jugal spine is no more prominent than in the preceding varieties. As is usual, this spine differs in size and shape on the two sides. It is wanting on the right side of No. 22653.

No. 22647 has exostoses in the auditory canals; on the right side a general thickening of the walls, and upon the middle of the posterior wall a globular tumor; on the left side the walls are thickened, which with a thick oval tumor on the middle of the posterior wall greatly reduces the calibre of the opening. At the narrowest point the antero-posterior diameter measures but 3 mm. No. 22653 has no exostoses in the meatus. In the middle of the forehead of No. 22647 is a superficial pit with slight traces of inflammatory action about it. There are no other marks of injury upon either skull.

In summing up the observations upon the twenty-five crania the following tables present the more prominent points:

TABLE I. CAPACITY.

	Megacephalic.			Mesocephalic.			Microcephalic.		
	♂	♀	y	♂	♀	y	♂	♀	y
Dolichocephalic.....	1			4			4	2	2
Mesaticephalic.....	4				2		1		1
Brachycephalic.....							1	1	
Sum.....	5			4	2		6	3	3
Total.....	5			6			12		

The cranial characters common to all are the excess in length of the parietal over the length of the frontal and occipital longitudinal arcs, the maximum breadth falling back of the auriculo-bregmatic line, the foramen magnum back of the centre of the base, and the low, narrow forehead and retreating frontal. A carinated ridge is common. All the lines, ridges and processes for muscular attachment are strongly developed, and the temporal line includes a large part of the side of the head. The mesaticephali and brachycephali vary from the more numerous dolichocephali in having the occiput less prominent, and smaller mastoid processes, as well as in the number, size and position of the Wormian bones.

The following table shows the position as to the sutures of the twenty-two Wormian bones found on eleven crania. Their size in the dolichocephali and mesaticephali does not exceed No. 3 of Broca's scale, while in the two broad skulls they are of the sizes 3, 4, 5 of the scale.

TABLE II. WORMIAN BONES.

	Epipteric.			Masto- parietal.			Masto- occipital.			Lambdoid.		
	♂	♀	?	♂	♀	?	♂	♀	?	♂	♀	?
Dolichocephalic..... ⁶				1			3			5	1	1
Mesaticephalic..... ³	1			1			1			1		
Brachycephalic..... ²										5	2	
Sum.....	1			2			4			10	4	1
Total.....	1			2			4			15		

Seven adult crania, or 36 per cent, have exostoses in the auditory canals. Dr. Blake found 5 per cent of 108 Californian crania, and 18 per cent of 195 mound-builders' crania, with exostoses in the meatus auditorius. There are sixteen exostoses in seven Mexican skulls, found in both canals of each. In the three mesaticephalic and brachycephalic crania the tumors are attended with a

TABLE III. EXOSTOSES.

	Anterior Wall.						Posterior Wall.					
	Flattened.			Rounded.			Flattened.			Rounded.		
	♂	♀	⅞	♂	♀	⅞	♂	♀	⅞	♂	♀	⅞
Dolichocephalic..... ³							6					
Mesaticephalic..... ³	2						2			4		
Brachycephalic..... ¹										2		
Sum.....	2						8			6		
Total.....	2						14					

general thickening of the wall of the canal. The face is long, straight and broad. The orbits open and square. The incisors which remain are vertical. The palate is broad and deep. The teeth are sound, but much worn by use.

TABLE IV. GNATHISM.

	Orthognathic.			Mesognathic.			Prognathic.		
	♂	♀	⅞	♂	♀	⅞	♂	♀	⅞
Dolichocephalic.....	5		2	4	1				
Mesaticephalic.....	2	1	1	1	1		1		
Brachycephalic.....				1				1	
Sum.....	7	1	3	6	2		1	1	
Total.....	11			8			2		

This table is interesting as it shows a decided tendency to orthognathism, and also because it is seen by it that the three children's crania have already assumed the prevailing form.

The nasal bones are long and broad, broader below than above, and set together at an obtuse angle not far from a right angle. The shape of the nasal aperture as seen by the following table varies greatly. The platyrhines have smaller nasal bones, set at a more open angle.

TABLE V. SHAPE OF NASAL APERTURE.

	Leptorhine.			Mesorhine.			Platyrrhine.		
	♂	♀	y	♂	♀	y	♂	♀	y
Dolichocephalic.....	5			2	1		2	1	2
Mesaticephalic.....	2	2				1	2		
Brachycephalic.....				1				1	
Sum.....	7	2		3	1	1	4	2	2
Total.....	9			5			8		

From the preceding table it appears that the male skulls tend to be leptorhine, and the female and children's to be mesorhine and platyrrhine.

As to the openness of the orbits, there is a great uniformity running through these skulls, as is shown by the following table.

TABLE VII. SHAPE OF THE ORBIT.

	Megaseme.			Mesoseme.			Microseme.		
	♂	♀	y	♂	♀	y	♂	♀	y
Dolichocephalic.....	6	2	2	3	1				
Mesaticephalic.....	5	2	1		1				
Brachycephalic.....	1	1							
Sum.....	12	5	3	3	2				
Total.....	20			5					

The lower jaw is noticeably slender. Its actual weight is less than a Californian, Peruvian or mound-builder's jaw of the same period of life. The height at the symphysis is always greater than at the last molar. The chin is prominent. The ramus is narrow and low, its coronoid slightly exceeding the condyloid process in height. The sigmoid notch is shallow. The condyle is small. The angle is everted in eleven of the fourteen jaws.

There is no anomaly of the teeth, except a small supernumerary tooth between the central incisors of each of the two upper

jaws. All the teeth are large and closely set. The incisors are vertical. The first upper molar shows traces of four cusps, but in all adult upper jaws this molar is worn so as to expose the ivory, and in four instances a clean section of the tooth has been made. In one case no enamel is to be seen, the tooth is worn to the neck, and the pulp cavity exposed at three points, a condition Broca designates as exceptional. There has been an abscess at the root of the tooth with considerable alveolar absorption probably to be traced to the irritation of attrition, after the pulp was exposed. The condition of the teeth of all these crania points to the use of hard, coarse food. One hundred and eighty-nine teeth are retained in the sockets of the twenty-three upper jaws. The rest with few exceptions have fallen out post-mortem. Two per cent of the retained teeth are carious, and two per cent of the empty sockets show traces of inflammatory action about the roots of missing teeth.

The lower jaw has also large teeth set close together. Its first molar has commonly five cusps. The wear is downwards and outwards, for all but the incisors which wear horizontally. Some of the teeth of both upper and lower jaws are excavated by use. The fourteen lower jaws have retained one hundred and forty-one teeth, of which but one is carious. None of the empty sockets of the lower jaw point to an unhealthy condition of the missing teeth. The lower jaw of No. 22647 is missing. The teeth of the upper jaw are worn flat, nearly to the neck. Upon the right side the molars have been lost by disease, and the alveoli are absorbed. The loss of these teeth has probably affected the wear of the second bicuspid adjoining, which has the posterior half of the crown worn off obliquely upwards and backwards. Upon the left side is the first molar whose extreme degree of wear has already been described.⁴

⁴ The left half of a child's upper jaw No. 22660 from San Lorenzo Cave, and the lower jaw of an adult No. 22701 from Acateta Cave were examined as to their dentition by Dr. W. C. Barrett of Buffalo, N. Y. No. 22660 belonged to a child seven years old. Where the bone is broken away, the first permanent bicuspid may be seen lying transversely with its root directly in the path of the permanent canine. This tooth Dr. Barrett states "might possibly have righted itself." He also remarks upon "the extraordinary wear of the deciduous teeth," which "gives considerable insight into the food, habits and early development of that people."

The two last molars of the left side of No. 22701 had each a large cavity in the grinding surface. When the jaw was found these cavities were filled with what "proves to be an organic substance." Dr. Barrett thinks it may be the remains of food and finds "certain internal evidences that it was not designedly placed there as a stopping."

CONCLUSIONS.

The foregoing observations indicate that the people who buried their dead in the caves of Coahuila were a strong-built, muscular race, of medium height. By the proportions of their skeletons they resemble the negro more nearly than the European type. When these burials were made, a natural long skull of small capacity was the most common form. This small, long head had a long, large face, with broad cheek bones, straight brows, square open orbits, a prominent straight nose, and wide but not projecting mouth, furnished with comparatively sound teeth, well worn by mastication. The black straight hair was worn in queues.

To what tribe they belonged or what was the date of their burial is unknown. Wislizenus, in connection with the Burial Cave near San Lorenzo which he describes, alludes to a conjecture that they were ancient Lipans. This is the only attempt at a solution of the problem.

The only crania from this region, whose measurements I have seen, are three Lipans, nine Comanches and thirty Apaches, given in the Check List of the Army Medical Museum edited by Dr. George A. Otis. One of three Lipans, one of the nine Comanches, and three of the thirty Apaches are dolichocephalic. This is hardly such a proportion as to ally them to the long-headed Cave people.

A larger collection of crania and bones from northern Mexico is needed to throw more light upon this question. By the aid of more material and further research it may become possible to trace the origin, wanderings and connections of this medium-sized, long headed people who buried their dead in the Caves of Coahuila.

The following tables give the particular measurements upon which this sketch is based.⁵

⁵The capacity is taken with mustard seed and measured by Busk's craniometer. All the diameters are taken with Flower's craniometer. The circumferences and arcs are taken with the tape measure. The projection measurements are taken by means of Broca's projection board.

All the measurements are taken and indices calculated according to Broca, except the following: those of the palate after Flower, the naso-malar angle after Flower. The nasal bones are measured with calipers after De Quatrefages. The bimastoid is the maximum diameter through the mastoid processes, the mastoid length is the vertical diameter from the tip of the process to a point vertically above it on the posterior root of the zygoma.

TABLE I. DOLICHOCEPHALI.

MUSEUM No.	SEX.	LOCALITY.	LONGITUDINAL DIAMETERS.			TRANSVERSE DIAMETERS.						HEIGHT, BASI-PREGNANT.	INDEX OF BREADTH.	INDEX OF HEIGHT.
			GLABELLUM OCCIPITAL.	(OPHYRO- OCCIPITAL MAXIMUM.	OPHYRO- INIAL.	MINIMUM FRONTAL.	STEPHANIAE.	DI-MASTOID.	DI-ACRICULAR.	TEMPORAL.	MAXIMUM.	ASTERIAE.		
22644	♂	San Lorenzo	130	184	181	88	107	122	119	130	132	117	146	743
22645	♂	"	150	189	187	96	117	131	127	133	139	118	138	738
22646	♂	"	155	184	181	101	108	132	125	131	135	114	145	746
22647	♂	Acetata	1325	183	182	95	113	125	120	129	133	109	125	731
22648	♂	"	1255	181	180	91	—	131	121	128	132	114	130	733
22701	♂	"	1400	188	185	86	111	129	121	130	138	—	131	746
22702	♂	Coyote	1350	177	178	94	110	122	118	128	132	101	129	722
22823	♂	"	1400	184	181	96	113	125	120	122	131	108	140	724
22843	♂	"	1575	179	179	88	105	123	116	126	130	102	130	734
Average...	♂	1361	183	182	92	111	127	121	129	134	110	134	736
Maximum...	♂	1560	189	187	101	117	132	127	133	139	118	145	801
Minimum...	♂	1255	177	178	86	105	122	116	122	130	101	125	721
Range.....	♂	255	12	9	15	12	10	11	11	9	17	20	114
22648	♀	San Lorenzo	1000	181	178	80	90	118	116	118	120	96	119	674
22706	♀	"	1200	181	180	85	102	120	118	128	133	104	124	680
22993	♀	Monchoya	....	183	181	90	103	120	116	120	122	104	127	702
Average...	♀	1140	182	180	85	98	119	117	122	125	100	123	684
Maximum...	♀	1260	183	181	90	103	120	118	128	133	104	127	733
Minimum...	♀	1000	181	178	80	90	118	116	118	120	96	119	674
Range.....	♀	260	2	3	10	13	2	2	10	13	8	8	33
22669	♀	Acetata	1275	174	175	87	104	—	111	120	128	97	127	731
22700	♀	"	1125	167	168	84	98	—	108	115	122	98	121	726

TABLE I. DOLICHOCEPHALI.—Continued.

MUSEUM NO.	PROJECTION OF HEAD.			HORIZONTAL CIRCUM-FERENCE.		HORIZONTAL ARCS.		TRANSVERSE ARCS.				LONGITUDINAL ARCS.			FORAMEN MAGNUM.	
	ANTERIOR.	POSTERIOR.	TOTAL.	PRE-ALTRICULAR.	POST-ALTRICULAR.	PRE-ALTRICULAR.	POST-ALTRICULAR.	FRONTAL.	PARIETAL.	OCIPITAL.	BREGMATIC.	PARIETAL.	FRONTAL.	OCIPITAL.	LENGTH.	WIDTH.
226414	98	104	202	242	297	293	297	267	284	259	259	125	125	125	36	28
226445	103	105	209	233	293	293	297	280	291	264	264	124	125	118	35	31
226446	102	93	195	210	271	271	287	289	309	318	285	131	133	129	40	37
22697	96	101	197	245	294	294	297	267	281	250	250	120	118	110	33	28
22668	107	91	198	249	273	273	281	22	28	35	35	15	15	19	7	9
22701	102	105	207	240	275	275	289	297	317	267	267	121	127	116	35	29
22702	96	88	184	236	266	266	285	293	305	250	250	123	127	124	34	31
22823	100	99	199	246	297	297	279	287	305	261	261	122	122	122	36	31
22846	102	97	199	236	292	292	279	283	293	256	256	120	122	112	35	30
Average....	101	98	199	237	271	271	280	280	305	264	264	124	125	118	35	31
Maximum....	107	105	209	245	293	293	289	289	309	318	285	131	133	129	40	37
Minimum....	96	88	184	229	262	262	267	267	281	250	250	120	118	110	33	28
Range	11	18	25	16	31	31	22	22	28	35	35	11	15	19	7	9
22648	—	97	—	235	292	292	245	245	248	245	245	114	126	115	32	29
22656	—	—	—	225	268	268	263	263	260	258	258	125	129	118	32	27
22663	—	—	—	224	—	—	245	245	273	—	—	110	132	114	37	34
Average....	—	—	—	225	260	260	258	258	267	252	252	116	120	116	34	29
Maximum....	—	—	—	225	268	268	263	263	260	258	258	125	132	118	37	34
Minimum....	—	—	—	224	252	252	245	245	248	245	245	110	126	114	32	25
Range	—	—	—	1	16	16	20	20	32	13	13	15	6	4	5	8
22939	—	—	—	222	—	—	267	267	281	247	247	119	132	110	33	30
22700	—	—	—	217	—	—	219	219	265	242	242	115	125	117	32	25

TABLE I. DOLICHOCEPHALI.—Continued.

MUSEUM No.	ANGLES.				TRANSVERSE DIAMETERS OF FACE.						HEIGHT OF FACE.	HEIGHT OF MALAR.	HEIGHT OF ALVEOLUS.	AFFRUITO-ORBITAL LENGTH.	OF ALVEOLUS.		
	FRONTAL.	OPHYRO-SPINAL.	DAUBENTON. (OF)	BASILAR.	MASO-MALAR.	BIZYGOMATIC.	BUCCAL.	INTER-MALAR SUPERIOR.	INTER-MALAR INFERIOR.	INTER-ORBITAL.					BASAL-NASAL LENGTH.	BASAL-ALVEOLAR LENGTH.	(NATHING INDEX.
22644	71°	17°	12°	24°	131°	126°	112°	56°	99°	24°	110°	25°	21°	67°	103°	97°	942
22645	70°	15°	10°	24°	137°	140°	125°	55°	95°	22°	100°	30°	25°	65°	103°	103°	910
22646	71°	16°	10°	24°	137°	140°	123°	57°	100°	27°	99°	33°	19°	70°	111°	101°	910
22667	71°	15°	10°	24°	127°	131°	118°	51°	98°	22°	96°	32°	19°	70°	101°	97°	960
22668	73°	15°	10°	24°	137°	135°	117°	52°	100°	23°	95°	29°	22°	65°	104°	107°	1029
22701	73°	15°	10°	24°	137°	137°	112°	53°	97°	24°	91°	26°	18°	64°	101°	96°	950
22803	73°	15°	10°	24°	137°	127°	112°	53°	97°	24°	91°	26°	20°	67°	105°	100°	952
22846	67°	15°	10°	21°	137°	128°	114°	59°	91°	23°	100°	30°	21°	63°	102°	100°	980
Average.....	71°	17°	12°	24°	132°	134°	117°	55°	98°	23°	108°	29°	21°	68°	103°	100°	971
Maximum.....	74°	18°	13°	25°	140°	140°	125°	59°	100°	27°	110°	33°	28°	71°	111°	107°	—
Minimum.....	67°	15°	10°	21°	125°	123°	112°	51°	94°	22°	91°	23°	17°	64°	100°	96°	—
Range.....	7°	3°	3°	4°	15°	17°	13°	8°	6°	5°	19°	10°	11°	7°	11°	11°	—
22548	68°	13°	10°	17°	143°	141°	114°	51°	95°	23°	91°	26°	—	67°	97°	97°	1000
22563	67°	13°	10°	17°	133°	145°	108°	51°	—	23°	91°	25°	—	69°	97°	97°	—
Average.....	68°	13°	10°	17°	139°	138°	111°	—	—	23°	—	25°	—	68°	—	—	—
Maximum.....	68°	13°	10°	17°	147°	151°	114°	—	—	23°	—	25°	—	68°	—	—	—
Minimum.....	68°	13°	10°	17°	133°	123°	108°	—	—	—	—	24°	—	67°	—	—	—
Range.....	1°	0°	0°	0°	14°	28°	6°	—	—	—	—	2°	—	2°	—	—	—
22564	—	—	—	—	—	—	95°	—	—	21°	—	19°	15°	62°	81°	83°	912
22700	—	—	—	—	—	—	95°	—	—	20°	—	21°	13°	61°	80°	82°	955

TABLE I. DOLICHOCEPHALI.—Continued.

MUSEUM NO.	OF PALATE.			OF ORBIT.			OF NASAL APERTURE.			NASAL BONES.					MASTOID LENGTH.
	LENGTH.	WIDTH.	INDEX OF WIDTH.	WIDTH.	HEIGHT.	INDEX OF HEIGHT.	HEIGHT.	WIDTH.	INDEX OF WIDTH.	LENGTH-MEDIAN.	LENGTH-LATERAL.	WIDTH-AT ROOT.	WIDTH-MINIMUM.	WIDTH-AT FREE EDGE.	
22944	55	66	120	38	35	121	57	29	509	29	29	15	10	22	34
22945	54	66	122	40	37	125	55	30	545	26	25	11	10	21	40
22946	56	70	125	41	35	124	57	27	474	26	29	15	12	20	38
22947	55	64	116	38	35	121	55	26	461	—	24	11	9	16	43
22948	54	63	117	38	33	808	51	28	519	—	26	14	13	22	37
22949	56	61	107	38	36	447	53	23	418	—	29	12	9	18	38
22950	—	—	—	41	39	478	55	25	472	25	27	11	10	18	36
22951	55	65	118	38	37	474	59	26	520	—	26	13	10	17	37
22952	56	65	116	37	34	519	51	24	441	24	31	11	7	16	34
Average...	55	65	118	39	35	897	54	26	481	24	27	12	10	19	37
Maximum...	56	70	125	41	37	—	57	30	—	24	31	15	13	22	43
Minimum...	54	61	109	37	33	—	50	23	—	24	24	11	7	16	34
Range.....	2	9	16	4	4	—	7	7	—	5	7	4	6	6	9
22953	52	62	119	37	35	516	48	25	521	—	—	12	9	—	33
22954	—	—	—	37	34	919	52	28	535	—	—	13	8	—	35
22955	—	—	—	39	34	872	—	—	—	—	—	13	—	—	39
Average...	—	—	—	38	34	805	50	27	510	—	—	13	9	—	36
Maximum...	—	—	—	39	35	946	52	28	535	—	—	13	9	—	39
Minimum...	—	—	—	37	31	572	48	27	531	—	—	12	8	—	33
Range.....	—	—	—	2	4	74	4	1	4	—	—	1	1	—	6
22956	40	63	158	34	34	1000	43	23	565	—	—	—	—	—	—
22957	42	55	133	33	32	970	40	23	575	—	—	—	—	—	—

TABLE II. MESATICEPHALI.

MUSEUM NO.	SEX.	LOCALITY.	CAPACITY.	LONGITUDINAL DIAMETERS.				TRANSVERSE DIAMETERS.						HEIGHT, BASI- REGMATIC.	INDEX OF BREADTH.	INDEX OF HEIGHT.
				GLABELLO- OCCIPITAL.	OPHTHO- OCCIPITAL.	OPHTHO- MAXILLAR.	OPHTHO- MAXILLAR.	MINIMUM FRONTAL.	STEPHANIAE.	DI-MASTOID.	DI-AURICULAR.	TEMPORAL.	MAXIMUM.	ASPERIAE.		
22451	♀	San Lorenzo	1900	187	184	179	179	97	120	118	117	132	138	120	139	755
22457	♀	"	1300	183	178	175	175	92	108	123	116	128	134	104	142	760
22458	♀	"	1175	185	184	174	174	93	116	130	128	133	139	110	135	763
22501	♀	Cayole	1540	183	181	173	173	92	116	129	124	134	138	109	136	784
22507	♀	"	1150	184	180	178	178	92	105	125	123	—	137	103	137	781
																761
Average...			1665	184	181	176	176	93	113	125	122	132	137	110	138	762
Maximum...			1600	187	184	179	179	97	120	130	128	134	139	120	142	—
Minimum...			1300	183	178	173	173	92	106	118	116	128	134	104	135	—
Range			300	4	6	6	6	5	14	12	12	6	5	16	7	—
22555	♂	San Lorenzo	—	177	176	170	170	93	—	125	120	126	133	109	129	733
22560	♂	"	1125	182	180	174	174	92	115	122	113	135	137	108	132	733
22561	♂	"	1125	174	174	172	172	91	115	121	119	127	136	109	134	739
Average...			1125	178	177	172	172	92	115	123	121	129	135	103	132	746
Maximum...			—	182	180	174	174	91	—	125	125	135	139	109	134	—
Minimum...			—	174	174	170	170	91	—	121	119	126	133	100	129	—
Range			—	8	6	4	4	2	—	4	6	9	6	9	5	—
22554	♀	San Lorenzo	1225	163	163	—	—	90	105	—	103	122	127	100	122	748

TABLE III. BRACHYCEPHALI.

22467	♂	San Lorenzo	1325	177	173	169	169	92	105	131	136	140	145	113	135	835	750
22533	♂	San Lorenzo	1240	165	164	161	161	87	111	130	146	126	132	96	126	805	708

TABLE II. MESATICEPHALI.—Continued.

MUSEUM NO.	PROJECTION OF HEAD.		HORIZONTAL CIRCUM-FERENCE.		HORIZONTAL ARCS.		VERTICAL TRANSVERSE CIRCUM-FERENCE.		TRANSVERSE ARCS.				LONGITUDINAL ARCS.			FORAMEN MAGNUM.	
	ANTERIOR.	POSTERIOR.	TOTAL.	PRE-ARTICULAR LAMB.	POST-ARTICULAR LAMB.	PRE-ARTICULAR LAMB.	POST-ARTICULAR LAMB.	FRONTAL.	PARIETAL.	OCIPITAL.	FRONTAL.	PARIETAL.	OCIPITAL.	LENGTH.	WIDTH.		
22643	102	114	216	248	281	248	281	265	314	335	275	129	133	—	30	—	—
22657	—	—	—	248	293	248	293	263	300	314	250	134	128	111	34	29	—
22658	107	100	207	238	273	238	273	242	302	317	270	132	125	123	37	37	—
22751	100	101	201	240	274	240	274	242	297	315	270	125	122	120	41	35	—
22857	94	103	197	235	272	235	272	240	295	313	255	130	133	115	38	31	—
Average....	101	105	206	248	273	248	273	241	292	311	255	130	128	117	38	32	—
Maximum....	107	114	221	249	281	249	281	267	314	335	275	134	133	123	41	37	—
Minimum....	94	100	197	235	272	235	272	240	295	313	255	125	122	111	34	29	—
Range....	13	14	19	4	14	4	14	28	19	22	25	9	11	12	7	8	—
22655	—	—	—	232	265	232	265	261	297	306	263	132	122	115	35	31	—
22656	97	10	107	237	266	237	266	259	298	310	258	128	112	118	40	32	—
22651	97	96	193	230	271	230	271	274	289	315	266	125	132	112	35	31	—
Average....	97	98	195	230	268	230	268	270	291	311	262	121	122	115	37	31	—
Maximum....	—	99	194	237	274	237	274	286	298	316	265	128	132	118	40	32	—
Minimum....	—	96	193	230	265	230	265	271	287	305	258	122	112	112	35	31	—
Range....	—	3	3	17	9	17	9	12	11	10	8	16	20	15	5	1	—
22653	—	—	—	241	278	—	278	248	275	305	250	110	115	106	39	30	—

TABLE III. BRACHYCEPHALI.—Continued.

22647	99	95	194	261	273	159	278	297	310	268	121	126	117	35	32	—	—
22663	100	86	186	248	253	411	268	278	295	250	116	123	102	33	30	—	—

TABLE II. MESATICEPHALI.—Continued.

MUSEUM NO.	ANGLES.			TRANSVERSE DIAMETERS OF FACE.						HEIGHT OF FACE.	HEIGHT OF MALAR.	HEIGHT OF ALVEOLUS.	OF ALVEOLUS.			
	FACIAL, OPHRYO-SPINAL.	DAUBENTON. (O)	BASILAR.	NASO-MALAR.	BIZYGOMATIC.	BUCGAL.	INTERALAR SUPERIOR.	INTERALAR INFERIOR.	INTERORBITAL.				ALVEOLAR LENGTH.	BASAL-ALVEOLAR LENGTH.	GONATHIC INDEX.	
22649	66°	—	—	131°	132	117	56	93	21	101	26	21	68	102	101	9.0
22657	68°	5°	24°	—	—	—	—	—	24	89	27	20	68	104	107	108.1
22731	68°	6°	17°	130°	138	119	58	96	22	100	25	20	66	103	97	94.2
22827	68°	6°	19°	131°	133	119	57	96	25	96	29	20	66	100	93	93.0
Average.....	68°	6°	19°	132°	134	115	57	95	23	97	26	20	67	102	100	98.0
Maximum....	68°	6°	21°	134°	138	119	58	99	25	101	29	21	68	104	107	—
Minimum....	66°	5°	14°	130°	132	117	56	93	21	89	24	20	66	99	93	—
Range.....	2°	1°	10°	4°	6	2	2	6	4	12	5	1	2	5	14	—
22653	73°	8°	19°	133°	128	111	50	—	—	90	22	17	66	—	—	—
22650	69°	—	19°	136°	120	107	51	92	21	88	24	18	63	97	96	94.1
22651	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average.....	71°	8°	19°	135°	124	109	51	91	22	89	24	18	66	100	96	96.0
Maximum....	73°	—	—	136°	128	111	51	92	22	90	27	18	69	102	—	99.0
Minimum....	69°	—	—	133°	120	107	50	89	21	88	22	17	63	97	—	94.1
Range.....	4°	—	—	3°	8	4	1	3	1	2	5	1	6	5	—	4.0
22654	—	—	—	—	—	—	—	—	21	—	20	11	55	87	85	97.7

TABLE III. BRACHYCEPHALI.—Continued.

22647	70°	8°	21	135°	113	122	57	90	23	95	28	22	64	101	90	18.0
22653	68°	5°	15°	133°	121	107	54	90	21	87	23	17	65	95	99	104.2

TABLE II. MESATICEPHALI.—Continued.

MUSEUM NO.	OF PALATE.			OF ORBIT.			OF NASAL APERTURE.				NASAL BONES.					MASTOID LENGTH.
	LENGTH.	WIDTH.	INDEX OF WIDTH.	WIDTH.	HEIGHT.	INDEX OF HEIGHT.	HEIGHT.	WIDTH.	INDEX OF WIDTH.	LENGTH. MEDIAN.	LENGTH. LATERAL.	WIDTH. AT ROOT.	WIDTH. MINIMUM.	WIDTH AT FREE EDGE.		
22649	54	63	117	41	39	951	55	25	455	28	29	14	9	15	34	
22657	—	—	—	40	37	925	—	—	—	—	25	15	12	—	37	
22658	59	70	119	39	36	923	44	28	636	10	7	4	3	6	37	
22791	55	64	116	39	36	923	56	31	553	26	27	12	10	19	33	
22827	54	63	117	38	35	921	55	26	473	—	—	13	11	—	37	
Average...	56	65	117	39	37	949	53	28	528	27	27	14	11	13	36	
Maximum...	59	70	119	41	39	—	56	31	—	28	29	15	12	19	37	
Minimum...	54	63	116	38	35	—	44	25	—	26	25	12	9	6	33	
Range	5	7	3	3	4	—	12	6	—	2	4	3	3	13	4	
22655	—	—	—	42	36	837	—	—	—	—	—	—	—	—	29	
22650	51	58	114	37	36	973	52	23	442	24	23	13	9	18	34	
22651	53	63	119	37	35	946	49	23	469	25	24	9	8	19	33	
Average...	52	61	117	39	36	923	51	23	451	25	24	11	9	19	32	
Maximum...	53	63	119	42	36	—	52	—	—	25	24	13	9	19	34	
Minimum...	51	58	114	37	35	—	49	—	—	24	23	9	8	18	29	
Range	2	5	5	5	1	—	3	—	—	1	1	2	1	1	5	
22654	44	61	139	36	34	944	42	21	500	—	—	—	—	—	—	

TABLE III. BRACHYCEPHALI.—Continued.

22647	55	—	—	41	37	902	53	27	509	28	27	13	10	18	37
22653	53	60	113	37	34	919	47	25	532	—	—	9	9	—	28

